Chapter 2 – Construction Site Management

2.1 Purpose

This chapter identifies the best management practices that should be used at construction sites to protect water quality, the environment, and existing park assets. These best management practices (BMPs) apply in cases of in-house improvements and for major capitol improvement projects (CIPs) implemented by the King County Department of Construction and Facilities Management (DCFM).

The King County Park System manages construction sites to preserve existing vegetation and infrastructure for several reasons:

- To enhance public safety by carefully maintaining the health of onsite vegetation and to reduce liability from situations such as slumping, siltation, flooding, dangerous trees, view blockage, and poor structural design that may lead to children climbing or having access to rocks that can be rolled or thrown. There are many situations that must be reviewed closely at the design (blue print) phase, to avoid such negative outcomes.
- To sustain both the function and value of vegetation assets and avoid vegetation placement in areas that may be hazardous (such as leaf fall on tennis courts, creating slippery surfaces and increased maintenance costs or cover for criminal behavior.
- To protect and improve water quality (such as silt fencing to reduce silt entering the storm sewer system).
- To reduce or avoid soil compaction and degradation.
- To avoid root or other physical injury to existing trees and other valuable vegetation.
- To protect soils and hydrology of the site.
- To protect existing irrigation, underground utilities, drainage and structures.
- To protect sensitive habitats for wildlife, fish, and amphibians.

2.2 Definitions

Construction site management: refers to the proper management of construction activities to preserve living and non-living elements of the ecological, environmental, aesthetic, and social landscape. For landscape maintenance, construction site management consists of BMPs employed during the three phases of site development: pre-construction, construction, and post-construction. These controls include BMPs for soils, shrubs, trees, drainage and irrigation. Tree preservation is a special concern during construction because tree roots often extend through the entire site.

"Dial-Before-You-Dig": a statewide system to allow location of underground utilities before construction. This contact is mandatory before earthwork begins. The phone number is **1-800-425-5555**.

Project Administrator: refers to either the person assigned by Parks, or by (DCFM) the Department of Construction and Facilities Management. The project administrator is responsible for managing the overall project.

2.3 Background

Successful park maintenance depends on good management of original construction. If construction is not managed carefully, the following can occur:

- Construction equipment improperly strikes or grades over vegetation, damaging plants.
- Site soil can be overly compacted or contaminated, blocking air and water movement essential to good health or polluted with weed seed.
- Hydraulic processes on site can be disrupted, causing permanent drainage problems.

These and other construction-related impacts produce long-term maintenance problems that can be avoided by following the BMPs in this section.

2.4 Pre-Construction

Planning

- Coordinate with Park staff to consider special event and public use schedules.
- Public process and customer/stakeholder input is very important. Contact park "friends of" groups and active users for planning and feedback.
- Before construction begins, the site must be inventoried and mapped. Site inventory includes determining size, species, and numbers of trees and plants on site. It also requires locating utilities, such as irrigation and drainage systems, historical elements such as archeological-protected areas and known landfills. Sensitive areas must be identified and habitat, wildlife assessments done.
- Before and during vegetation removal, the Park Horticulturist or Resource Coordinator is responsible for decisions about on-site vegetation.

- Know the development and building regulations concerning trees and vegetation, drainage and other major requirements that may be in place in the area. The Department of Development and Environmental Services (DDES) and/or the adjoining city building department are good sources of information.

- Ensure that permits are secured and acquired before construction. Specific requirements must be followed.

- The project manager or construction supervisor must contact "Dial-Before-You-Dig" (**1-800-425-5555**) to locate any underground utilities on site.

- Avoid steep grades in turf. For safety and operation performance, no grades steeper than 4 to 1 are allowed in mown turf.

- Avoid installing trees where leaves and roots will damage and increase maintenance time to clean surfaces such as tennis courts and outdoor pools.

- Ensure that irrigation systems comply with *King County Irrigation Specifications and Water Audit Guidelines* and with the *State of California Irrigation Auditor Handbook*, version 5.5, June 1990.

- Drainage systems must be adequately sized, operable, and maintainable.

- Protect natural water flows and drainage patterns.

- Avoid installing isolated restrooms or picnic areas far from active areas. This creates opportunity for loitering, graffiti or other criminal activities.

- Avoid placing athletic fields below grade of hard surfaces, paths and parking lots, due to flooding/drainage problems.

- Avoid casting shadows with night lighting that may create cover for criminal activity.

Irrigation System Design Guidelines and Water Audit Implementation

The purpose of the irrigation and water audit implementation is to:

- Establish a structure for designing water efficient irrigation systems.

- Promote the values and benefits of landscape, while recognizing the need to utilize water and other resources as efficiently as possible

All new and rehabilitated irrigation systems shall follow the *King County Irrigation Specifications and Water Audit Guidelines*.

All new and rehabilitated irrigation systems at a minimum shall be in accordance with the state of California Landscape Water management Program as described in the *Landscape Irrigation Auditor Handbook* version 5.5 June 1990.

Particular attention should be given, when designing park areas, to protect water systems through the installation of back-flow protectors. Irrigation systems should be provided with fittings to allow ease of winterization. Water should also be provided near hard surfaces, such as tennis courts for pressure washing and clean up purposes.

Construction Site Preparation

Staging and Fencing

- Staging areas for equipment must be established far enough away from plant material to protect plants and roots. This usually is at the drip line or farther from the plant crown or stem.
- Entry and exit routes must be established and fenced off with chain-link or construction fencing. When planning routes, avoid utility access corridors.
- Chain-link fencing or a similar protective barrier must be installed around all valuable vegetation that will remain onsite. The fencing is installed at least as far or farther than the drip-line of existing trees. These fenced and protected areas are known as "vegetation protection areas."

Mulching

The following five areas must be mulched with 12 to 18 inches of wood chips, hog fuel, or other acceptable material. Mulch will aid in protecting against compaction and root injury, as well as reduce puddling or muddy conditions. The material must be removed from these areas when construction is complete. This mulch must be disposed of in an appropriate location, such as a composting bin, and the site restored to original or better condition.

1. Vegetation protection areas (Horticulturist or District Manager will identify).
2. Entry or exit areas.
3. Staging areas.
4. Near existing irrigation systems.
5. High-use equipment areas.

Other Protection

- Protect irrigation, utilities and drainage systems on site.
- Ensure silt fencing is erected by streambeds and as appropriate (buffer zones).
- Prune, clean and remove deadwood from trees and plants as directed
- Fertilize existing plants and trees at the direction of the Park Horticulturist or Resource Coordinator.

- Protect hard surfaces from cracking, chipping and marring. Use plywood under buckets, outriggers and stress points, and heated asphalt. Prevent truck and heavy equipment from rolling on corners and thin surface areas.

2.5 Construction

- Assure all safety equipment, signage, and sirens/backups are in working order or in place.
- Monitor construction frequently enough to ensure compliance with specifications.
- Conduct pre-construction meeting to establish protection areas and work plan.
- Locate cement washout pits and chemical holding areas away from vegetation protection areas and areas that drain to systems and waterways.
- Limit parking and material storage to already damaged areas away from tree roots.
- Allow no site offices, equipment, or material storage in vegetation protection areas.
- Control and minimize grade changes within vegetation protection areas. Generally, no changes in grade are allowed within the drip line of any tree to remain on site. If the grade must be raised around a desired tree, a dry well must be constructed around the tree at the drip line or some point farther away from the tree trunk.

- Keep refueling and equipment maintenance areas away from trees, native soils, and water. In general, fuel spills are not tolerated on construction sites.
- Control and protect overhead and underground utility corridors. Tunneling under root zones is preferable to trenching in root areas near trees.
- Use tree protection barriers, wraps, and pads when working near trees. Keep these safeguards in good repair.
- Do not install vegetation materials late in spring or summer unless fully automated irrigation is present and working.
- To the extent possible, keep construction equipment away from all on site vegetation, especially those within designated areas. Designated areas are where there are especially sensitive or fragile plants, or that contain historical or special plantings.
- Preserve park users' quality of experience. Create safe corridors. Provide educational and informative signage. Be aware of children and families near site.

2.6 Post-Construction Care

Maintaining existing and established new vegetation is the primary horticultural focus after construction. This care requires identifying problems and treatments that may preserve these resources. If warranted, severely damaged vegetation should be removed quickly and replaced with new plantings.

The following cultural practices can preserve trees, plant material and landscape areas:

- Resource staff must closely monitor and inspect all new construction throughout the warranty period to ensure plant establishment.
- Weekly water management (critical function). This is generally the contractor's responsibility for the establishment period.
- Ensure contractor compliance with plant establishment warranty period. Contact project manager with any concerns. Document the contact.
- Fertilize with an appropriate product, as needed. Wait one growing season before making minimal Nitrogen applications. Maintain levels for 3 to 5 years. No fertilizer should be applied in buffer zones where it could contaminate nearby water.
- Maintain a depth of 2 to 3 inches of mulch around trees and new plantings. Soil and mulch should be sterile and weed-free. Well-aged compost or wood chips are good products to use. Avoid placement against trunks or bark.
- If the Park Horticulturist believes there to be flaws with the structural integrity of a tree, remove it immediately.
- Watch closely for pests and changes in tree structure. Preventive treatments may be advisable.
- Emphasize weed control during plant establishment period (3 to 5 years). Use well-draining, weed-free sterile soil.
- An "independent" irrigation audit to ensure proper irrigation must be done where there is a significant amount of planting or turf. The Irrigation Specialist or Grounds Supervisor can arrange for an audit as needed.

The non-living portions of a park development should be observed closely to ensure that problems are noted and corrected during the warranty period.

- Note any drainage problems and identify for correction.
- Note pavement conditions. There should be no dips, holes, unraveling of asphalt. Concrete must have expansion joints to reduce cracking. Re-bar and steel ties should be installed to avoid settlement of panels. A minimum of 4" to 6" of compacted rock base

should be established prior to installation. Proper widths of pavement must be installed per Washington State trail and road standards.

- Irrigation should be monitored and proper spacing/coverage noted. Independent water audits should be run upon completion of the project.
- Building elements (windows, gutters, roof structures, drainage around buildings, painted surfaces, lighting, plumbing, security alarms, telephone and computer lines, fire suppression system, stainless steel restroom facilities, resource staff space, showers, storage space, mop sinks, window blinds, storage for furniture and equipment) should be observed and deficiencies noted.

2.7 Training

- Train all construction personnel to ensure their understanding of construction site BMPs.
- Train all staff on sensitive area identification, protection requirements and techniques.
- Train all staff on water quality protection; permit requirements and endangered species act requirements.
- The Park Horticulturist, Resource Coordinators, and Resource staff must receive current training and education in construction site management. This training includes the most-recent advances for protecting trees on construction sites.
- Horticulturist and Resource Coordinators should receive training in appraising and evaluating tree and plant damage according to International Society for Arboriculture (ISA) standards.

All staff will be trained in turf care, drainage, paving, structures and irrigation.